Pop Spot LED-module for circular fixtures
3.5W 360lm

POP

Product description

- Spot module for circular fixtures
- High power LED for constant current
- Simple connection with poke-in connectors
- Easy mounting with screws
- Wide range of secondary optics

Technical parameters

Electrical and optical [1]

CCT	Min. luminous flux [lm]			Typ. forward voltage [V]			Typ. power consumpt. [W]			Efficacy [lm/W]		
	700mA	1000mA	1200mA	700mA	1000mA	1200mA	700mA	1000mA	1200mA	700mA	1000mA	1200mA
2200K	200	270	313	2.85	2.92	2.96	2.00	2.92	3.55	100	92	88
2700K	190	256	298	2.85	2.92	2.96	2.00	2.92	3.55	95	88	84
3000K	190	256	298	2.85	2.92	2.96	2.00	2.92	3.55	95	88	84
4000K	210	283	329	2.85	2.92	2.96	2.00	2.92	3.55	105	97	93
5700K	230	310	360	2.75	2.92	2.96	1.92	2.92	3.55	119	106	101

[1] Flux values are presented at junction temperature T_J = 85°C. T_J can be calculated, see section 'Junction Temperature'.

Photometric

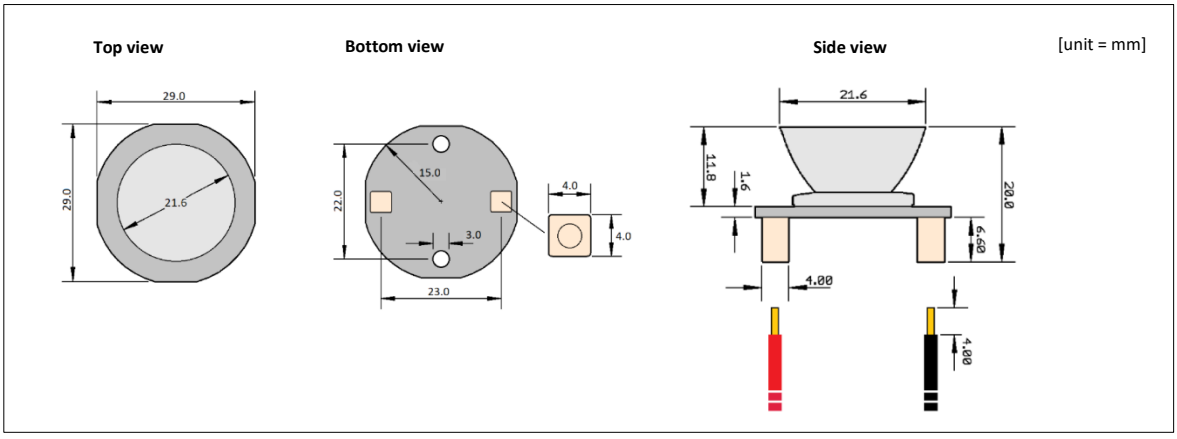
CCT	Colour consistency SDCM	Colour rendering index CRI	R9 value
2200K	3	> 80	-
2700K	3	> 90	> 50
3000K	3	> 90	> 50
4000K	3	> 90	> 50
5700K	3	> 90	> 50

Beam characteristics

Name	Digits in part # [2]	Angle [FWHM]	Type
No optics	No digits	120°	-
Real spot	RS	8°	TIR Lens
Medium	M	28°	TIR Lens
Wide	W	43°	TIR Lens
Oval	O	9x52°	TIR Lens

[2] See chapter for Ordering data

Mechanical dimensions



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Handling

Electrical supply

The Pop LED module must be connected to a constant current driver. Using constant voltage drivers will permanently damage the module. Pop has a built-in polarity protection device. This means that reversed voltages up to 60V will not damage the LED.

Pop modules are not protected against overvoltages, overcurrents, overloads or short-circuit currents. Safe and reliable operation can only be guaranteed in conjunction with a LED driver which complies with the relevant standards.

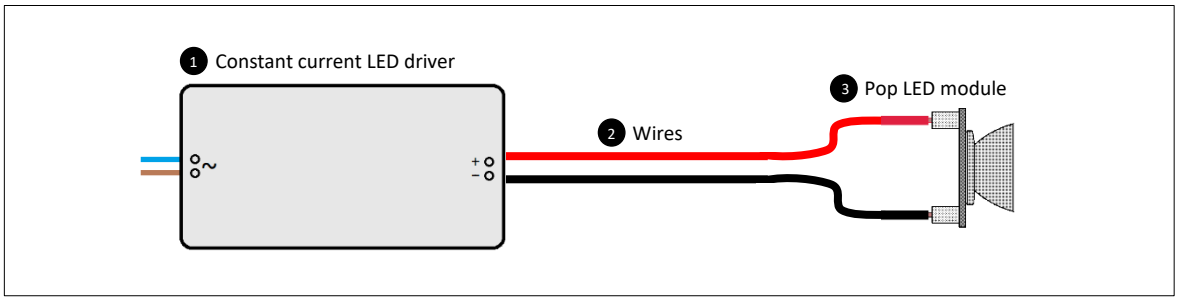
Mounting

The preferred way of mounting Pop to its heatsink is to use M3 screws with a nut and a washer or self-tapping screws.

An alternative is to place thermally conductive tape on the back side. After the protective film of the tape has been removed the module can be attached to a flat heat-dissipating surface. A light force should be used when pressing evenly on the module to remove air bubbles between tape and substrate and to make the adhesives stick properly to the heatsink. The surface should be cleaned with isopropanol to remove any grease before adhesion. **Note! Adhesion on powder coated surfaces might be very weak. Always attach to a clean metal surface.**

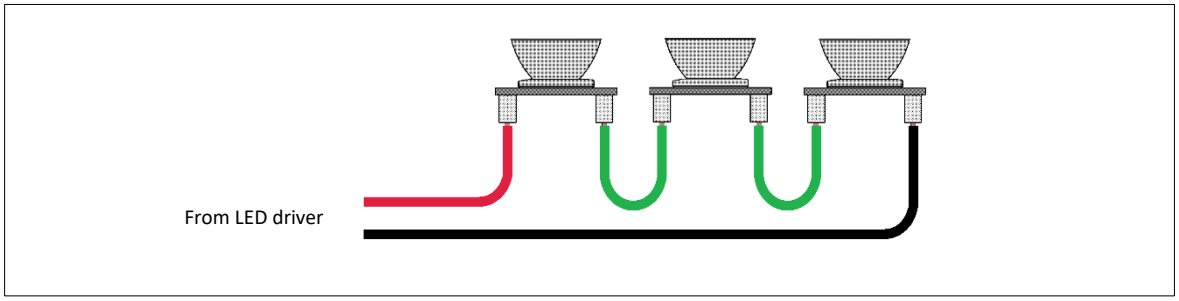
Wiring

From the LED driver two power leads should be connected to the two poke-in connectors on Pop. Red wire goes to positive output and black to negative. Driving only one Pop from a driver requires the driver to be capable of loads down to 2.8V.



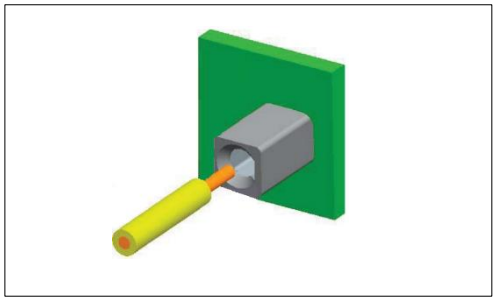
Wiring example

Serial connection by linking each minus connector to the plus connector on the following module.



Wiring types

Both stranded and solid wires can be used. Cross sectional area should be between 0.13 to 0.82 mm^2 (AWG 18-26). Max insultation diameter is 2.2mm. Dismantle each wire 4.0 mm.



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Removal and recycling

If Pop is to be removed after it has been fitted with its adhesive tape there is always a risk of damaging the module, so be cautious. The removal is done by inserting the blade of a flat tool between its back side and the surface to which it is attached and slightly bending upwards. If the module survives the removal, a new tape can be attached, and the module can be re-used.

In order to recycle Pop it should be discarded at a recycling station in the bin for electronics.

Technical data

LED type	LUXEON® Z ES
LED current, max	1200mA
Board temperature at TC point, max	80°C
Reverse voltage, max	Reversed voltage not allowed
ESD sensitivity	>8kV (Class 3B HBM)
Thermal resistance Rth_{J-A}	2°C/W
PCB material	MC PCB
Connector	Inverted Thru Board WTB

Lifetime and thermal details

The lifetime of an LED module is defined by the time measured from when a certain number of LEDs is switched on and to the point when the percentage of its original lumen output has decreased to a certain level. It is most common to use L70B50 to represent the lifetime figure of an LED. The L value represents the remaining light level and the B value defines the quantity of the test objects that has failed. L70B50 means that 50% of the LEDs are below the 70% original light output.

Parameter	LED-current	Max temp at TC-point	Estimated lifetime
L70B50	1200mA	80°C when using optics	>60 000 hours
L70B50	1200mA	105°C without optics	>60 000 hours

To define the temperature of the module the power should be switched on long enough for the system to get a stable temperature, typically 60-90 minutes. Measurement can be done in two ways:

- Using a thermal logger with a thermocouple. The tip of the thermocouple should be glued to the TC point.
- Using a thermal imaging camera

By using a thermocouple; remove the secondary optics in order to measure the temperature at the TC point. The point is marked and located just below the LED. It is recommended to use a micro, AWG 40 or smaller, thermocouple in order to prevent light being absorbed by the sensor.

By using a thermal imaging camera; measurement should be done immediately after turning the LED off so that the emitting photons will not interfere with the sensor.

Junction temperature

The junction temperature T_J can be calculated by this formula:

$\mathbf{T_J = T_C + P \times 8}$ where T_C is the temperature at the TC-point and P is the electrical power that is fed to the LED. P = Vf x If.

Energy efficiency class

CCT	Classification
2200K	F
2700K	F
3000K	F
4000K	F
5700K	E

Energy efficiency class is defined at nom. LED current 700mA. At other currents the energy efficiency class might be another.

Harmonizing standards

Standard	Description
IEC 62471	Photobiological safety of lamps and lamp systems
IEC 62778	Blue light hazards

Ordering data

Part number	CCT	Qty per carton
SM1-POP-22K8-x	2200K	84 pcs
SM1-POP-27K9-x	2700K	84 pcs
SM1-POP-30K9-x	3000K	84 pcs
SM1-POP-40K9-x	4000K	84 pcs
SM1-POP-57K9-x	5700K	84 pcs

Accessories

A table with examples of accessories available for Pop.

Name	Part #	Specification	More information
Constant current driver 24W	L05011i3	200-1200 mA CC, 0-10V, 3V min output voltage	L05011i3
Constant current driver 28W	AL20D-PH	200-900 mA CC, push-dim, 0-10V dim, DALI, 3V min output voltage	AD20D-PH